ORIGINAL ARTICLE

Perceptions on the Use of Dissection Videos in Learning Gastrointestinal Anatomy among Medical Students

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ABSTRACT

Background and Objective. Lockdowns due to COVID-19 pandemic led to a shift to online learning in the University of the Philippines-College of Medicine. The study of gross anatomy is difficult in itself but was compounded by the lack of cadaveric dissection. To bridge this learning gap, medical students had a limited face-to-face activity with cadaveric prosection. As a supplement, dissection videos on gastrointestinal anatomy were viewed prior to the activity. This study aimed to determine the perceptions and experiences of students on the use of dissection videos.

Methods. We described the perceptions of students on the dissection videos based on their evaluation form responses after rotating in the OS 206 course module on gastrointestinal anatomy. A 5-item evaluation form was rated using a 4-point Likert scale. Categorical variables were described by frequency and percentages using Microsoft Excel.

Results. A large majority (97% to 99%) strongly agreed that the videos were easy to access and had good audio-video quality. Around 68%-70% strongly agreed that the videos enhanced their understanding and made their learning experience pleasant and enjoyable. Around 70% would recommend the videos to fellow students. Only a few (<3%) had negative perceptions on the videos.

Conclusion. Dissection videos on gastrointestinal anatomy prior to cadaveric prosection laboratory sessions were perceived by medical students as accessible, good quality, and helpful aids in the study of gross anatomy.

Keywords: dissection video, gastrointestinal anatomy, medical students, perceptions

eISSN 2094-9278 (Online)
Published: October 26, 2023
https://doi.org/10.47895/amp.v57i10.7183

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INTRODUCTION

In February 2020, 85% of enrolled students worldwide were affected by the Coronavirus Disease 2019 (COVID-19) pandemic, based on the United Nations Educational, Scientific and Cultural Organization (UNESCO). The United Nations' Global Goal 4, which calls for high-quality education for all people, was significantly hampered,[1] as the pandemic has worsened the already-existing educational problem, from a few countries having no school closures to several countries having closures for more than a year.

The COVID-19 pandemic brought unprecedented challenges in medical education, including the University of the Philippines College of Medicine, disrupting traditional gross anatomy laboratory dissection methods and necessitating alternative learning modalities.[2] An international cohort of medical students claimed that the epidemic had a considerable unfavorable overall effect on their undergraduate education.[3]

The role of non-cadaveric teaching methods in gross anatomy is still unclear. Cadavers are great for imparting clinically relevant anatomical information, teaching the anatomy of large organs, and displaying a variety of typical anatomical variation. Additionally, they help students comprehend the three-dimensional form of the body structures through tactile and sensory perception.[4]

Dissection is a skill that students frequently need to acquire, and it is not surprising that students want greater direction on dissection.

Dissection educational videos (DEVs), now categorized as computer-assisted instruction or learning, and referred to as a technology-enhanced learning tool, have been incorporated into many classrooms. Dissection videos were the second highest ranked resource in the study by Abdullah et al.[2] Videos were particularly beneficial for understanding concepts and visualizing anatomical relationships and were evaluated highly by students as a tool that assisted them in picturing the 3D anatomy of the structures and integrating the various body systems, but not as highly as cadaver prosection was. This method can be used to review the structures that should be identified in a certain dissection, as replacement for parts of the dissection that use atlases, or even to demonstrate how to complete a dissection from start to finish.[5]

Cadaveric prosections were deemed to be one of the most effective teaching tools overall. According to medical students, it would be cadaver prosections combined with an active learning clinical tutorial, followed by dissection videos, electronic resources, printed materials, plastinated specimens, and plastic models. The use of the DEV combined with an active learning clinical tutorial enhances the learner-content as well as the learner-instructor interaction.[2]

Videos serve as cornerstone of teaching in blended learning and are often the main information-delivery mechanism in online courses.[2] Dissection videos are now being included in electronic dissection manuals. As class sizes have grown, one strategy to retain small groups in the laboratory has been to alternate the dissection time among the students, so that not every student is exposed to the study of every structure at the same time. Dissection movies may be useful in these situations for the students who are not yet dissecting.

Gastrointestinal anatomy is included in OS 206 course as part of the organ system integrated curriculum of first year students in the University of the Philippines College of Medicine.

As the COVID-19 cases decreased and the lockdown eased in the Philippines, the Department of Anatomy held a bridging educational activity, the Learning Enhancement in Anatomy Program (LEAP), which included the gastrointestinal module of Organ system (OS) 206 course (Abdomen and Pelvis).

This study aimed to describe the perceptions on the DEV and towards incorporating DEV as a teaching tool in the OS 206 gastrointestinal module. The outcome of this work is expected to shed light on the potential value of dissection videos as an additional tool to models and cadaveric prosections.

METHODS

This was a cross-sectional, retrospective study, which performed a secondary analysis of the evaluation form responses of 1st year medical students that was collected as part of the evaluation process of LEAP-2.

The LEAP-2 program was a week-long program for 1st year medical students held from June 13 to June 17, 2022, right after the final examination week. Organized by the Department of Anatomy of the University of the Philippines-College of Medicine, it was meant to be an optional bridging educational activity program to allow the students to have face-to-face exposure to pre-dissected cadavers and to reinforce what the students learned online throughout the year in the different Organ System (OS) courses.

A senior professor prepared four instructional dissection videos on: 1) anterior abdominal wall (16 minutes and 32 seconds), 2) the abdominal wall (12 minutes and one second), 3) mobilization and exploration of the gastrointestinal tract (15 minutes and 11 seconds), and 4) the peritoneal cavity and its recesses (11 minutes and 34 seconds). A Google Drive link to the four dissection videos on gastrointestinal anatomy was sent to the students before the start of the LEAP 2. Students were instructed to view the videos prior to going to the Organ system (OS) 206 station, which was on gross anatomy of the gastrointestinal (GI) system.

The paper-based questionnaire which was included in the post-LEAP 2 evaluation forms was manually distributed to and collected from the students. Students who were not able to watch the videos prior to rotating to the OS 206 station were not required to answer the evaluation forms. The evaluation forms were answered by students immediately after the group has rotated in the OS 206 (GI anatomy) station.

Prior to data analysis, the evaluation forms were anonymized by redacting the student number of the respondent. Other information such as sex at birth, premedical course, and previous exposure to a human anatomy course were collected and included in data analysis. The evaluation form consisted of five statements, answerable with a 4-point Likert scale (1 = strongly agree to 4 = strongly disagree). The first two rated the GI anatomy dissection videos in terms of accessibility and quality. The next two statements explored the students' perceived usefulness of the videos to their learning and understanding of the topic. The 5th statement rated if they would recommend the videos to other first year medical and paramedical students. An open-ended free text question was asked to solicit any comments and suggestions for improvement.

All information gathered were manually entered into a Google form. An electronic spreadsheet file was then

extracted. The collected data were numerically coded for statistical analysis. Descriptive statistics such as frequency and percentage were used for the categorical data variables. Microsoft Excel was used to generate appropriate graphs.

A score of 1 or 2 (strongly agree or agree) is considered a positive satisfaction and perception, while 3 or 4 (disagree or strongly disagree) is negative satisfaction and perception. Comments and suggestions were listed and tallied.

This study was an analysis of the data collected in the evaluation forms filled out by the students after their rotation in the OS 206 station. There were no individual consent forms signed by the study participants. The National Ethical Guidelines for Health and Health Related Research states that, "Provided that the following do not involve more than minimal risks of harms", protocols such as educational evaluation activities, may be considered by the REC for exemption from review (NEGHHRR 2017, page 38).[6]

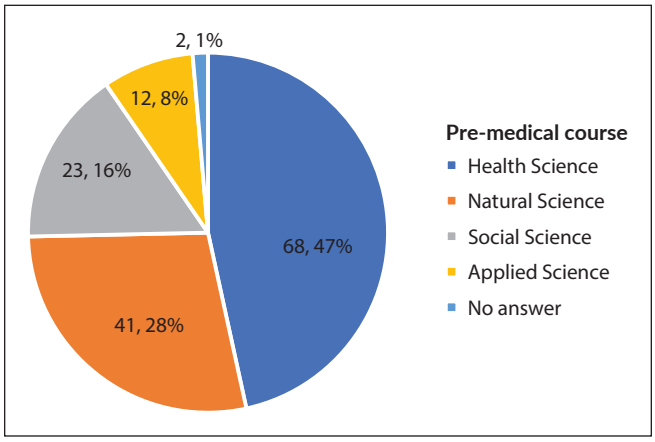

Figure 1. Number of respondents, by premedical course.

This study was approved by the University of the Philippines Manila Ethics Review Board as part of a mother protocol on the evaluation of the learning enhancement anatomy (LEAP-2) program during the COVID-19 pandemic (UPM-REB 2022-0456-EX).

RESULTS

Of the 178 students who participated in LEAP 2, 146 students (82%) answered the survey questionnaire. The students were instructed to watch the videos prior to their rotation in the OS 206 station, hence, those who were not able to do so, did not answer the questionnaire. Of the respondents, 53.4% (78) were female and 46.6% (68) were male. Majority (60%) of the respondents have had no anatomy courses during their premedical years and the learning enhancement program was their first exposure to anatomy, more so, to cadaver dissection.

Majority (46.6%) of the respondents had premedical courses in the health sciences, such as INTARMED, Public Health and Nursing (Figure 1). The rest of the respondents took courses in the natural sciences 28.1% (Biology, Chemistry), social sciences 15.8% (Psychology) and applied sciences 8.2% (Engineering).

Ninety-nine percent agreed that the dissection videos were easy to access and easy to view (Item 1), while 97% agreed that the videos had good visual and audio quality (Item 2) (Figure 2). Some respondents commented that one of the videos had audio only on random clicks and not all throughout the duration of the video. This could have been affected by internet connection issues since the videos were uploaded in Canvas and had to be viewed online.

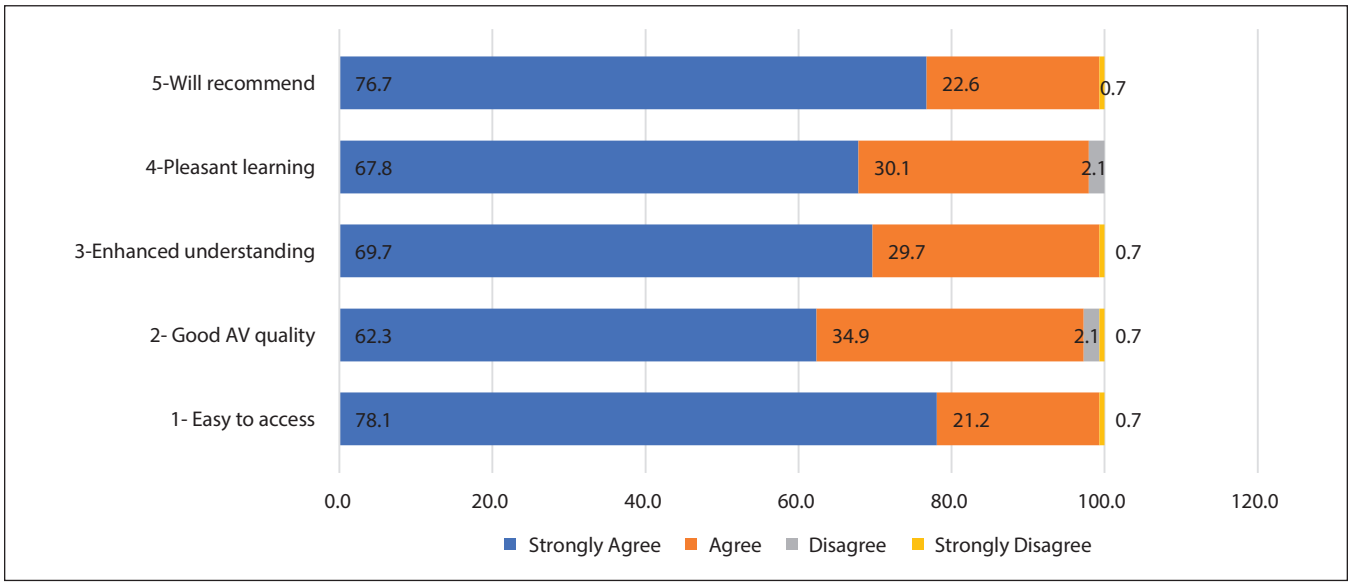

Figure 2. Distribution of responses to 5-item questionnaire.

More than two thirds (69.7%), strongly agreed that the dissection videos enhanced their understanding of gastrointestinal anatomy (Item 3). They commented that the videos served as a good supplement to the cadaver dissection and the dissection videos aided their understanding of the GI system through the use of clear labels which made the structures easier to view and comprehend. A similar percentage of students (67.8%) strongly agreed that the videos made their learning experience enjoyable and pleasant (Item 4).

More than three fourths (76.7%) of the respondents strongly agreed that they will recommend the videos to other LU3 medical as well as paramedical students (Item 5).

DISCUSSION

Majority of the responses were either "strongly agree" or "agree" in terms of the perceived ease of use, accessibility, and video quality. Additionally, the majority also responded "strongly agree" and "agree" that the dissection videos aided the student's better understanding of the topic and that they are a pleasant and enjoyable way to learn. Most would also recommend the videos to fellow students. The use of dissection videos and the availability of a clinical instructor during a face-to-face dissection activity helps improve the learner-content, learner-instructor as well as the learner-learner interaction. However, a few students responded "disagree" in perceived ease of use and accessibility since the videos are uploaded online and internet connection problems may affect accessibility and audio video quality. The results of this study is only limited to 1st year medical students in the UPCM who had prior online gross anatomy modules followed by attendance in the year-end LEAP activity.

The same findings were observed in the study by Abdullah et al., which showed that about 60% of the students found watching dissection videos to be a fun way to study anatomy, although the majority thought that the videos should be short in length. The presence of an instructor to lead them through the video was appreciated by 83% (236/284) of the students, and after watching, 85% (241/284) said they would like to discuss the material with the instructor. The majority of students preferred an open lab arrangement where they could access the films whenever they wanted. Only 23% (66/284) of the students were open to replacing cadaveric prosections entirely with dissection videos. Dissection videos, according to the majority, improved their understanding of and retention of anatomical information from anatomy courses.[2]

According to Guo et al., the median engagement time for videos less than 6 minutes long is 100%, while student engagement drops as videos lengthen. For videos 9-12 minutes, the engagement rate is 50% and it drops to 20% for videos 12-40 minutes long.[7] The length of the dissection videos used in this study ranged from 11 minutes to 16 minutes. Improvements on these may be done by further shortening the videos to maximize student engagement. A measure to promote active learning, which was used in our study, is making the video a part of a larger homework assignment. Watching the videos prior to LEAP is a preparation for the students in their dissection activity in the OS 206 station.

Majority of the respondents in our study agreed that the videos helped them understand the topic better and contributed to making their learning experience enjoyable. This agrees with a study by Mustafa et al., wherein 85% also said that the dissection videos helped improve their understanding of anatomy. Additionally, 76% said that watching these videos helped them memorize anatomical details. Thirty-five percent (100/284) concluded that dissection videos are sufficient for teaching medical students about anatomy without the requirement for lectures. Additionally, 60% (169/284) said that seeing dissection films improved their scores on their anatomy exams.[4] However, the effect of DEVs on the students' anatomy examination scores were different across studies.

Similar results were also found by Zipay et al. in 2020, when they studied the effect of online review videos in gross anatomy on the performance of chiropractic students. In their study, a series of seven gross anatomy review videos were made available for the students online, which they may view at their convenient time. After viewing the videos, a 13-item questionnaire was answered by the respondents and they found out that students felt the online review videos were easy to use, an enjoyable way to study, and a helpful resource for studying the course content. The favorable levels of satisfaction may be due to the flexibility of scheduling, unlimited availability, and the ability for students to engage in self-paced learning.[8]

Keller defines learning satisfaction as a student's overall positive assessment of his or her learning experience. Satisfaction can be measured only after the learning activity.[9] Dissection videos, being a self-regulated learning modality, are dependent on the students' personal intention of viewing them. Nagy et al., in their study in 2016 examined the determining factors of students' video usage and their learning satisfaction relating to the supplementary application of educational videos. They found that perceived usefulness, perceived ease of use, attitude, and internet self-efficacy are factors that affect video usage and in turn, affect learning satisfaction. Perceived ease of use, beside its effect on attitude, has a direct effect on perceived usefulness as well. Both perceived usefulness and perceived ease of use have a direct effect on system use.[10] Also, this could affect the user's perception on the videos being recommendable. Our study gathered responses on the students' perception on the videos' accessibility and quality, and while the majority strongly agreed that the videos were of good quality, some still experienced difficulty accessing the videos online which could be affected by internet connection. Technical issues may be minimized if the videos are downloadable or stored in offline platforms, which were also some of the suggestions of the respondents.

In this study, the dissection videos on gastrointestinal anatomy were viewed by students before rotating in the gastrointestinal anatomy station of the anatomy learning enhancement course, where they may also freely interact with their anatomy professors. Combination of different modalities have been the preferred teaching tool of the students, as shown by the study of Tayyem et al., which reported that 49% of their students favored anatomy learning through pairing lectures and cadaveric dissection, while, 39% favored a pairing of cadaveric dissection and multimedia as the best method of anatomy teaching.[11] In the study by Kerby et al. in 2011, medical students ranked prosection and demonstration as the top teaching method when it comes to achieving anatomy learning, clinical background, medical vocabulary, 3D appreciation, and appreciation to variation in comparison to models, and computer-assisted learning (CAL).[12] Across studies, students still do not prefer permanent termination of face-to-face lecturers and dissection laboratories.

The results were also observed in the study (16 students) by Natsis et al., which investigated students' perceptions of the effectiveness of "online" pre-recorded DEVs in supporting anatomy teaching through updating lectures and strengthening comprehension.[13]

A greater frequency (84.2%) used at least one self-teaching tools (STT) during pandemic while 76% attended the online lectures. Up to 59.2%of the students disapproved of the online lectures permanently replacing the traditional face-to-face lectures, while 62.8% approved of the parallel delivery of the lectures. The most frequently used resources were combined instructional tools. Majority of the students favored the permanent inclusion of the pre-recorded DEV series in the lectures, and 83.2% claimed that the termination of the dissection laboratories had a detrimental impact on their education.[13]

The results of this study may not be generalizable to other first year medical students with different premedical background and learning proficiency, as well as to other fields of medicine, especially where clinical skills, not just identification of anatomical structures are of importance.

Study results may also have possible confounders. Study participants were medical students who may have differences in their individual learning styles (e.g., sensing-intuitive, visual-verbal, active-reflective, and sequential-global) as well as their preferences in terms of use of visual, virtual, or verbal learning aids. Additionally, study participants came from different premedical school courses with differences in exposure to anatomy, animal, or cadaveric dissection.

CONCLUSION

Medical students were generally satisfied with the perceived ease of use, accessibility, and audio-video quality of the dissection videos given to them prior to an in-person instructor-guided laboratory session in gastrointestinal anatomy. There was also a positive perception that it aided understanding of the topic. Although feedback is generally positive, it is important to constantly improve the dissection videos based on the respondents' comments and suggestions. This way, regardless if face-to-face learning or blended learning, the videos would always be a good supplementary teaching modality to help students learn anatomy. Further prospective studies using a more comprehensive questionnaire are recommended to better assess the respondents' level of satisfaction. Pre-test and post-test quiz scores may also be compared to determine the effect of the videos on the students' knowledge on GI anatomy.

Limitations

This study has limitations. The questionnaire used was a simple 5-item survey and can seem to be answered by a yes or no. The development of the video material could also be documented to incorporate the principles on how to create effective teaching videos.

The DEVs were prepared by a senior anatomy professor and as part of the evaluation, it may seem that the students were being asked to grade the work of their professors. Potential social desirability and leniency bias are part of the study's limitations. Social desirability bias in performance assessment is the tendency to rate based on socially desired achievement instead of using an objective performance criteria such as automatically giving the highest score or giving the same scores for all.[14] Leniency bias on the other hand is giving favorable ratings despite the possible need for improvement.[15] However, the students' favorable responses and evaluation could not be controlled by the investigators.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

All authors declared no conflicts of interest.

Funding Source

This study was investigator-funded, with a proposed budget to cover for the operational expenses. The Department of Anatomy has hired a research assistant, the salary of which was funded by the Department. No monetary benefits or honorarium were given to the subjects.

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